WE CLAIM:

1. A method of forming a layer in a selected area on a wafer in a single growth step, the method comprising:

in a single growth step, performing the steps of:

forming a mask on a substrate of the wafer defining a selective area growth region coinciding with the selected area, the selective area growth region having a growth enhancement ratio of greater than one;

growing a layer on the wafer such that a thickness of the layer in the selective area growth region is greater than a thickness of the layer elsewhere on the wafer; and

etching the layer at an etching concentration and for a duration which leaves a thickness of the layer in the selective area growth region and removes the layer from elsewhere on the wafer.

2. A method according to claim 1 wherein the etching concentration is at least a concentration sufficiently high such that etching occurs at near kinetic limited conditions, wherein growing occurs as a result of Metalorganic Epitaxial Chemical Vapor Deposition, and wherein the mask is a dielectric mask.

3. A method of integrating optical devices on a wafer in single growth step, the method comprising:

in a single growth step, performing the steps of:

forming a dielectric mask on a substrate of the wafer defining a selective area growth region for forming a first optical device in the selective area growth region, and a second optical device in an adjacent planar region, the

selective area growth region having a growth enhancement ratio of greater than one;

growing a first optical device layer in the selective area growth region and the planar region of the wafer with a thickness in the selective area growth region greater than a thickness in the planar region according to the growth enhancement ratio; and

etching the first optical device layer at an etching concentration and for a duration which removes the first optical device layer from the planar region and leaves a thickness of the first optical device layer in the selective area growth region.

4. A method according to claim 3 wherein the etching concentration is such that the etching rate in the planar region is substantially equal to the etching rate in the selective area growth region.

5. A method according to claim 3 further comprising the step of:

forming a common layer of both the first optical device and the second optical device by growing the common layer in the selective area growth region and the planar region;

wherein a step of forming a first optical device layer of only the first optical device comprises said step of growing the first optical device layer and said step of etching the first optical device layer.

6. A method according to claim 5 further comprising:

performing the steps of forming a first optical device layer a first prescribed number of times and forming a

common layer a second prescribed number of times to form the first optical device and the second optical device.

7. A method according to claim 3 wherein the first optical device is an active device and the second optical device is a passive device.

8. A method according to claim 6 wherein the first optical device is a laser and the second optical device is a waveguide.

9. A method according to claim 3 wherein the first optical device is an active device and the second optical device is an active device.

10. A method according to claim 6 wherein the first optical device is a laser and the second optical device is an optical amplifier.

11. A method according to claim 3 wherein the etching concentration is at least a concentration sufficiently high such that etching occurs at near kinetic limited conditions, and wherein growing occurs as a result of Metalorganic Epitaxial Chemical Vapor Deposition.

12. A method according to claim 8 wherein the step of performing the steps of forming a first optical device layer a first prescribed number of times and forming a common layer a second prescribed number of times comprises:

forming a lower cladding layer as a common layer;

forming a lower waveguide layer as a common layer;

forming an upper waveguide layer as a common layer; and

forming an upper cladding layer as a common layer.

13. A method according to claim 12 wherein the first optical device is a laser and the second optical device is a waveguide, the step of performing the steps of forming a first optical device layer a first prescribed number of times and forming a common layer a second prescribed number of times further comprising:

forming a barrier layer as a first optical device layer;

forming a well layer as a first optical device layer;

repeatedly performing the steps of forming a barrier layer and forming a well layer a preset number of times equal to the desired number of wells for the laser; and

forming a barrier layer as a first optical device layer.

14. A method according to claim 10 wherein the step of performing the steps of forming a first optical device layer a first prescribed number of times and forming a common layer a second prescribed number of times further comprises:

forming a laser barrier layer as a first optical device layer;

forming a laser well layer as a first optical device layer;

repeatedly performing the steps of forming a laser barrier layer and forming a laser well layer a first preset number of times equal to a desired number of wells for the laser which exceed a number of wells for the amplifier;

forming an amplifier and laser barrier layer as a common layer;

forming an amplifier and laser well layer as a common layer;

repeatedly performing the steps of forming an amplifier and laser barrier layer and forming an amplifier and laser well layer a second preset number of times equal to a desired number of wells for the amplifier; and

forming an amplifier and laser barrier layer as a common layer.

15. A method of forming a layer in a selected area on a wafer in single growth step, the method comprising:

in a single growth step, performing the steps of:

forming a mask on a substrate of the wafer defining a selective area growth region coinciding with the selected area, the selective area growth region having a growth enhancement ratio of greater than one;

growing a layer on the wafer such that a thickness of the layer in the selective area growth region is greater than a thickness of the layer elsewhere on the wafer; and

etching the layer at an etching concentration and for a duration which leaves a first thickness of the layer in the selective area growth region and a second thickness of the layer elsewhere on the wafer, wherein the ratio of the first thickness of the layer in the selective area growth region to the second thickness of the layer elsewhere on the wafer is smaller than the growth enhancement ratio.